COMPATIBILITY ASSESSMENT GUIDELINE
FOR PRE-EVR
PHASE II VAPOR RECOVERY SYSTEMS
AND
ONBOARD REFUELING VAPOR RECOVERY EQUIPPED VEHICLES

Premise

Compatibility of a Phase II vapor recovery system with onboard refueling vapor recovery (ORVR) control is to be assessed by analyzing the pressure profile collected from the Phase II system operating at a facility that dispenses approximately 80% of its throughput to ORVR-equipped vehicles.

Discussion

Emissions associated with the refueling of motor vehicles have traditionally been controlled by Phase II Vapor Recovery Systems installed at dispensing facilities. Beginning with the 1998 model year, the federal government mandated that on-board refueling vapor recovery (ORVR) systems be phased-in for motor vehicles and trucks. Vehicles equipped with ORVR capture refueling emissions by utilizing carbon canisters mounted in the vehicles. Studies completed by the ARB staff demonstrated that due to an increased interaction with ORVR-equipped vehicles, certain Phase II vapor recovery systems may generate excess emissions. As a result CP-201 (Certification Procedures for Vapor Recovery Systems at Gasoline Dispensing Facilities) was adopted to require the assessment of Phase II vapor recovery systems while fueling a fleet comprised of 80% ORVR-equipped vehicles.

Based on the operation of these two control strategies, impacts on the performance of the current Phase II system designs due to their interaction with ORVR-equipped vehicles can be realized by studying the pressure profile gathered from a Phase II installation servicing a high volume of ORVR-equipped vehicles. Excess emissions will be avoided by systems that maintain a vacuum or that operate at a pressure less than what was recorded during certification testing conducted prior to 1998.

Potential test sites will be surveyed to determine the percentage of fuel that is routinely distributed into ORVR-equipped vehicles. During testing, simulated ORVR fuelings will be conducted as necessary to achieve the desired representation of ORVR equipped vehicles. The desired dispensing facilities will be inspected to verify that all the equipment is certified and operating in compliance with the applicable standards. All sites will include a pressure/vacuum (P/V) valve and will be tested to determine proper operation of the Phase II vapor recovery system.

At each test facility, the underground storage tank (UST) pressure, UST vapor temperature, ambient temperature and ambient pressure will be monitored and data collected and stored at one minute intervals over a continuous 7 day period. Additionally, information may be documented on the direction of vapor flow during the fueling of ORVR and non-ORVR vehicles. It will be ideal if the facilities shut down overnight so diurnal effects can be evaluated.

Acceptance Criteria

A Phase II system will qualify as ORVR compatible when one of the following performance standards, which does not compromise the systems ability to effectively capture refueling emissions from non-ORVR vehicle fuel tanks, is met:

(a) The system maintains an average vacuum or zero pressure, during the observed time, while distributing approximately 80% of its fuel to ORVR equipped vehicles;

Or

(b) The system operates at an average pressure, during the observed time, less than the lowest average pressure that was recorded during certification testing prior to 1998, while distributing approximately 80% of its fuel to ORVR equipped vehicles;

Or

(c) The system operates, during the observed time, at an average pressure less than what was required for certification, while distributing approximately 80% of its fuel to ORVR equipped vehicles.

AND

(d) All specified failure and challenge mode testing are successfully completed.

Applicability

1. This compatibility assessment is intended to evaluate the effects on the performance of pre-EVR Phase II vapor recovery systems due to the interaction with vehicles equipped with Onboard Refueling Vapor Recovery (ORVR).

2. When this assessment is referenced in a plan for ORVR compatibility determination for a Phase II system, additional information must be supplied such as, but not limited to, type of system, test site locale and the method for achieving the required ratio of ORVR type fuelings.

Biases

1. Pressure profiles may vary depending on fuel volatility. All testing shall be performed using commercial gasolines formulated for the season in which

testing occurs. The Reid Vapor Pressure will be determined during the monitoring period.

2. Vapor recovery system operating pressure may be influenced by bulk deliveries. Data collected during deliveries will be included in the calculation of average operating pressure in accordance with proposed CP-201, unless evidence is provided that a delivery was non-compliant.

Pre-test

1. Test Site Criteria

Dispensing facilities must be located within 100 miles of Sacramento and be equipped with a pre-EVR CARB certified Phase II vapor recovery system.

2. ORVR Penetration

The percentage of ORVR equipped vehicles at a site will be estimated by direct observation of the vehicles fueled. The following data will be collected for at least 200 fuelings:

- Vehicle make
- Vehicle model
- Vehicle model year
- Vehicle engine class
- Amount of fuel dispensed per observed vehicle

3. System and Facility Preparation

The following information is to be recorded for each fueling point: dispenser manufacturer, hose manufacturer and configuration and, nozzle manufacturer and model. All the equipment is to be inspected for defective conditions. Faulty equipment is to be removed and replaced.

The installations must demonstrate compliance with the Executive Order and applicable standards such as the leak decay test (TP-201.3), the air to liquid ratio test (TP-201.5), the dynamic back pressure test (TP-210.4), and the liquid blockage test (TP-201.6). In addition, each P/V vent valve will be checked to verify compliance with the leak rate performance standard and with the pressure and vacuum actuation performance standards.

4. Equipment and Installation

Reference Proposed ARB method TP-201.7: Continuous Pressure Monitoring

Data Collection

1. Record storage tank pressure, storage tank vapor temperature, ambient temperature, and ambient pressure data for a period of 7 days (per TP-201.7). (Note: The facility must demonstrate compliance with the leak decay standard prior to and after the data collection period).

2. Survey stations for ORVR penetration

Failure Mode Testing

1. To be determined after an application for compatibility testing is submitted.

Reduction of Data

Data is downloaded into a laptop type computer on a regular basis and the data is imported into a spreadsheet. Individual data points for UST vapor pressure can be broken down into intervals. Using these intervals, specific time measurements for given pressure ranges can be recorded and plotted.